The invention claimed is:

1. An omnidirectional two dimensional imaging apparatus comprising:

(a) A truncated convex reflective mirror that reflects an image of substantially hemi spherical scene;

(b) An imaging sensor means positioned to receive said omnidirectional images;

whereby images with wide field-of-view of substantially hemispherical scene from a single viewpoint can be obtained.

2. An apparatus as recited in claim 1, wherein the reflective mirror is a substantially hyperbolic reflective mirror whereby the substantially hemispherical omnidirectional images with single viewing center can be obtained.

3. An omnidirectional stereo camera apparatus comprising of a pair of optically aligned omnidirectional two dimensional imaging systems as recited in claim 1 whereby the stereo omnidirectional images can be obtained.

4. An omnidirectional stereo camera apparatus comprising of a pair of optically aligned omnidirectional two dimensional imaging systems as recited in claim 2 whereby the stereo omnidirectional images can be obtained.

5. An omnidirectional three dimensional camera apparatus comprising:

(a) An omnidirectional two dimensional imaging systems as recited in claim 1;

(b) An omnidirectional structured light projection means;

whereby the three dimensional measurement of the surrounding objects in the omnidirectional scene can be obtained.

6. An omnidirectional three dimensional camera apparatus comprising:

(c) An omnidirectional two dimensional imaging systems as recited in claim 2;

(d) An omnidirectional structured light projection means;

whereby the three dimensional measurement of the surrounding objects in the omnidirectional scene can be obtained.

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